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| EXAMINER |
|---|
| SHAH, PARAS D |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2626 | |

| NOTIFICATION DATE | DELIVERY MODE |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 10/721,271 | OH ET AL. |
| | Examiner | Art Unit | |
| | Paras Shah | 2626 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on <u>*18 September 2007*</u>.

2a)☐ This action is **FINAL**.     2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-33* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 7-15, 18-22 and 24-31* is/are rejected.

7)☒ Claim(s) *6, 16, 17, 23, 32 and 33* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All  b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

# DETAILED ACTION

1.      This communication is in response to the Arguments filed on 9/18/2007. Claims

1-33 remain pending and have been examined. Furthermore, the IDS was not

considered as it fails to provide an English translation of the Abstract for the foreign

patents. All objections and rejections that have not been addressed by the Examiner

have been withdrawn.

## *Change of Art Units*

2.      It should be noted that the Examiner has changed art units from 2609 to 2626.

## *Information Disclosure Statement*

3.      The information disclosure statement filed 11/26/2003 and 05/10/2004 fails to

comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation

(Abstract that has been translated, see below) of the relevance, as it is presently

understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about

the content of the information, of each patent listed that is not in the English language.

It has been placed in the application file, but the information referred to therein has not

been considered. The information disclosure statement contains foreign patents for

which no translation of the abstract is provided.

## *Response to Arguments*

4.      Applicant's arguments, see pages 10-18, filed 09/18/2007, with respect to the

rejection(s) of claim(s) 1 and 18 under Janiszewski *et al.* in view of Ching *et al.* have

been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

However, upon further consideration, a new ground(s) of rejection is made in view of

Kushner in view of Durlach *et al.*

## *Claim Rejections - 35 USC § 103*

5.      The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.      Claims 1, 2, 18, 19 is rejected under 35 U.S.C. 103(a) as being unpatentable

over Kushner *et al.* (US 6,862,567) in view of Durlach *et al.* (US 5,828,997) in view

Eryilmaz (US 5,867,574).

As to claims 1 and 18, Kushner *et al.* teaches a voice region detection apparatus,

comprising:

a preprocessing unit for dividing an input voice signal into frames (see

col.4, lines 6-7, segments acquisition window into frames.);

a frame state determination unit for classifying the frames into voice

frames and noise frames (see col. 4, lines 29-37, speech/noise classifier done by

microprocessor 110) based on the random parameters extracted by the random

parameter extraction unit; and

a voice region detection unit  (see col. 5, lines 9-14, microprocessor 110)

determines the starting point and ending point of the speech utterance.) for

detecting a voice region by calculating start (see col. 6, lines 8-9 and Figure 2, microprocessor 110 determines the starting point and ending point of the speech utterance) and end positions of a voice based (see col. 6, lines 65-66 and Figure 2, endpoint is determined) on the voice and noise frames input from the frame state determination unit (e.g. From the determination of a speech utterance the voice regions are detected based on energy.).

However, Kushner et al. does not specifically teach the whitening unit for combining white noise to the input frames.

Durlach et al. does teach the whitening unit combining white noise to the input frames (see col. 5, lines 56-65 and Figure 2, target signals (speech) 50a, 50b, and 50n are added with the noise generator 60 by mixer 56). Although white noise is not used when adding to the target signals, it would have been obvious to add white noise to a signal or any other type of noise depending on environment simulated.

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the voice recognition as taught by Kushner et al. with the addition of a whitening unit as taught by Durlach et al. The motivation to have combined the references involve the ability to incorporate the directionality of a signal for sound localization (see Durlach et al., col. 5, lines 60-65) as would benefit the preprocessed signal from Kushner et al. for real-time environmental simulation.

However, Kushner et al. in view of Durlach et al. do not specifically teach the random parameter extraction unit.

Eryilmaz does teach the random parameter extraction unit (see col. 4, lines 30-42, speech energy value determined) for extracting random parameters indicating the randomness of frames (see col. 2, lines 30-55, voice activity is detected based on the comparison to a threshold. The determination of energy is random since it is not known whether the frame is voice or noise. Further, the randomness is addressed by indicating the noise or voice present in the signal).

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the voice recognition as taught by Kushner et al. in view of Durlach et al. with the addition of random parameter extraction unit as taught by Erlyimaz for the purpose of classifying the voice frames and noise frames as taught by Kushner et al. in view of Durlach et al. by a method for classification.


As to claim 2 and 19, Kushner et al. in view of Durlach et al. in view of Eryilmaz teach all of the limitations as in claims 1 and 18 above.

Furthermore, Kushner et al. teaches wherein the preprocessing unit samples the input voice signal according to a predetermined frequency (see col. 3, lines 66-col. 4, lines 10, digitize) and divides the sampled voice signal into a plurality of frames (see col. 4, lines 4-10, segmentation into frames is performed.) (e.g. The digitization of the voice signal makes the use of sampling frequency

obvious as the signal is sent to the microprocessor for further processing. It is

obvious that this sampling frequency is utilizing the Nyquist criterion.)


As to claim 4 and 21, Kushner et al. in view of Durlach et al. in view of Eryilmaz

teach all of the limitations as in claims 1 and 18 above.

Furthermore, Durlach et al. teaches wherein the whitening unit comprises

a white noise generation unit (see Figure 2, noise generator 60) for generating

the white noise, and a signal synthesizing unit (see Figure 2, mixer 56) for

combining the frames input from the preprocessing unit (see signals 50a, 50b,

and 50n) with the white noise generated by the white noise generation unit (e.g.

Noise is added to the target signal.).


7.      Claims 3 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kushner et al. in view of Durlach et al. in view of Eryilmaz as applied to claims 2 and 19

above, and further in view of Mekuria (US 6,182,035).

As to claims 3 and 20, Kushner et al.  in view of Durlach et al. in view of Eryilmaz

teach all of the limitations as in claims 2 and 19 above.

However, Kushner et al. in view of Durlach et al. in view of Eryilmaz do not

specifically teach the frames overlapping with one another.

Mekuria does teach the overlapping of frames (see col. 8, lines 28-29).

It would have been obvious to one of ordinary skilled in the art at the time

the invention was made to have combined voice recognition as taught by

Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz with the overlapping of

frames as taught by Mekuria. The motivation to have combined the references

involves the use of samples in more than one frame (see Mekuria col. 8, lines 28-

29).

8.      Claims 5 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz as applied to claims 1 and 18

above, and further in view of Davis *et al.*(US 2003/0216909).

As to claim 5, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz teach all

of the limitations as in claim 1 and 18 above.

Furthermore, Durlach *et al.* does teach the whitening unit combining white

noise to the input frames (see col. 5, lines 56-65 and Figure 2, target signals

(speech) 50a, 50b, and 50n are added with the noise generator 60 by mixer 56).

Furthermore, Eryilmaz does teach the random parameter extraction unit

(see col. 4, lines 30-42, speech energy value determined).

However, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz do not

specifically teach wherein the calculation of the numbers of runs (see [0046],

consecutive frames that fulfill the energy threshold.

Davis does teach wherein the calculation of the numbers of runs (see

[0046], consecutive frames that fulfill the energy threshold.( If x number of frames

meet the requirement than it is determined that speech is present, otherwise

noise or non-speech is present.) consisting of consecutive identical elements in the frames.

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have combined voice recognition as taught by Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz with consecutive runs of the random parameter as taught by Davis *et al.* The motivation to have combined the references involves the ability for the VAD processor to produce the chance for short-term events triggering a VAD state change (see Davis *et al.* [0046]).

9.      Claims 7-9 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz as applied to claims 1 and 18 above, and further in view of Pastor (US 5,572,623).

As to claims 7 and 24, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz teach all of the limitations as in claims 1 and 18, above.

However, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz do not specifically teach the voice frames including vocal frames and fricative frames.

Pastor does teach the frames including vocal and fricative frames (see col. 4, lines 66-67 and col. 5, lines 5-14).

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have combined the voice recognition as taught by Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz with the inclusion of

fricative frames as taught by Pastor. The motivation to have combined the references involves the inclusion of fricatives that are present in at the start and end of speech (see Pastor col. 1, lines 29-33).

As to claims 8, 9, 25, and 26, Kushner et al. in view of Durlach et al. in view of Eryilmaz in view of Pastor teach all of the limitations as in claims 7 and 24, above.

Furthermore, Eryilmaz teaches wherein the frame state determination unit (e.g. voice activity detector) determines if the random parameter of a frame extracted by is below a first threshold (see col. 2, lines 30-55, voice activity is detected based on the comparison to a threshold.) The determination of energy is random since it is not known whether the frame is voice or noise.) then it is a vocal frame (e.g. If the noise is below the value of the threshold, then speech is present or vocal frame. The use of a specific threshold would have been obvious to one skilled in the art in order to distinguish voice from noise. Hence, the use of below or above a threshold is matter of design choice and relativity. The Applicants do not indicate reasons for selecting the stated thresholds (see Applicant's Specification, page 11, lines 17-21).

10.    Claims 10, 11, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kushner et al. in view of Durlach et al. in view of Eryilmaz in view of

Pastor as applied to claims 8 and 25 above, and further in view of Chong-White *et al.* (US 7,065,485).

As to claims 10, 11, 27, and 28, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz in view of Pastor teach all of the limitations as in claims 8 and 25, above.

However, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz in view of Pastor do not specifically teach if the random parameter of a frame extracted by the random parameter extraction unit is above a second threshold, the relevant frame is a fricative frame.

Chong-White *et al.* does teach if the random parameter of a frame extracted by the random parameter extraction unit (see col. 7, lines 22-25, energy ratio computed, similar to Erlylimaz) is above a second threshold (see col. 7, lines 46-47, fricatives identified when above a threshold), the relevant frame is a fricative frame. As to claims 11 and 28, it would have been obvious to select a threshold value for comparing different types of values of a signal with respect to a ration.

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have combined the voice recognition as taught by Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz in view of Pastor with the inclusion of a threshold indicating a fricative as taught by Chong-White *et al.* The motivation to have combined the references involves the ability to detect further unvoiced components in a signal consisting of speech and non-speech.

Furthermore, the use of the voice recognition as taught by Kushner *et al.* in view

of Durlach *et al.* in view of Eryilmaz in view of Pastor allows the ability to detect

noise, voice and fricatives contained in the signal.

As to claims 12, 13, 29, and 30, Kushner *et al.* in view of Durlach *et al.* in

view of Eryilmaz in view of Pastor in view of Chong-White teach all of the

limitations as in claims 8 and 25, above.

Furthermore, Eryilmaz teaches wherein the frame state determination unit

determines that if the random parameter of the frame extracted by the random

parameter extraction unit is below the second threshold, the relevant frame is a

noise frame (see col. 2, lines 30-55, voice activity is detected based on the

comparison to a threshold. The determination of energy is random since it is not

known whether the frame is voice or noise).

However, Eryilmaz does not specifically teach the use of two thresholds

for comparison.

It would have been obvious to use multiple thresholds for classifying each

frame so that the detection of voice and fricative frames can be detected as

taught by Chong-White above. Further, the values for the thresholds used are a

matter of design choice based on the thresholds computed.

11.     Claims 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz as applied to claim 1 above,

and further in view of Rezayee *et al.* ("An Adaptive KLT Approach for Speech

Enhancement").

As to claim 14, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz teach

all of the limitations as in claim 1, above.

However, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz do

not specifically teach a color noise elimination unit for eliminating color noise

from voice.

Rezayee *et al.* teaches the enhancement of speech from colored noise

(see Abstract).

It would have been obvious to one of ordinary skilled in the art to have

combined the voice recognition as taught by Kushner *et al.* in view of Durlach *et*

*al.* in view of Eryilmaz with the inclusion of a color noise eliminator as taught by

Rezayee *et al.* the motivation to have combined the references is since colored

noise consist of various noise variances and is not the same as white noise,

which has same variance (see Rezayee *et al.* page 87, right column, 3$^{rd}$

paragraph, lines 12-17).

12.    Claims 15 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz in view of Pastor in view

of Chong-White *et al.* (US 7,065,485) as applied to claims 10 and 27, above and further

in view of Rezayee *et al.* ("An Adaptive KLT Approach for Speech Enhancement").

As to claims 15 and 31, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz in view of Pastor in view of Chong-White *et al.* teach all of the limitations as in claim 1, above.

However, Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz in view of Pastor in view of Chong-White *et al.* do not specifically teach a color noise elimination unit for eliminating color noise from voice.

Rezayee *et al.* teaches the enhancement of speech from colored noise (see Abstract).

It would have been obvious to one of ordinary skilled in the art to have combined the voice recognition as taught by Kushner *et al.* in view of Durlach *et al.* in view of Eryilmaz in view of Chong-White with the inclusion of a color noise eliminator as taught by Rezayee *et al.* the motivation to have combined the references is since colored noise consist of various noise variances and is not the same as white noise, which has same variance (see Rezayee *et al.* page 87, right column, 3rd paragraph, lines 12-17). Furthermore, it should be noted that the following elimination of colored noise is being done when speech is present. Hence, the detection of a vocal frame will entail speech is present and further enhance the signal from colored noise.

### *Allowable Subject Matter*

13.     Claims 6,16, 17, 23, 32, and 33 are objected to as being dependent upon a

rejected base claim, but would be allowable if rewritten in independent form including all

of the limitations of the base claim and any intervening claims.

14.     The following is a statement of reasons for the indication of allowable subject

matter:   None of the prior art alone or in combination teach the following limitations:

$NR=R/n$, as recited tin claims 6 and 23;  "color noise ... obtained... amount of reduction

in the random parameter...due to color noise" as recited in claims 16,17, 32, and 33.


### *Conclusion*

15.     Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Paras Shah whose telephone number is (571)270-1650.

The examiner can normally be reached on MON.-THURS. 7:00a.m.-4:00p.m. EST.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Patrick Edouard can be reached on (571)272-7603.  The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

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system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


P.S.
10/25/2007

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